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**The Subgenus *Cordandrena* of the Genus *Andrena* Newly
Recorded from Eastern Asia, with a New Species
(Hymenoptera, Andrenidae)^{1), 2), 3)}**

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Abstract. The subgenus *Cordandrena* of the genus *Andrena* is recorded from eastern Asia for the first time. Two species are recognized, one new species, *Andrena (Cordandrena) yukawai* is described from Xinjiang Uygur, China and *Andrena (Cordandrena) cordialis* Morawitz is recorded from eastern Asia for the first time. A key to species of *Cordandrena* in eastern Asia is given.

Key words: taxonomy, Hymenoptera, Andrenidae, *Andrena*, *Cordandrena*, revision, new species, eastern Asia.

Introduction

The subgenus *Cordandrena* Warncke is represented by five species (Warncke, 1968,

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1975; Osytshnjuk, 1977; Dylewska, 1987; Gusenleitner & Schwarz, 2002) in the west Palaearctic Region. Warncke (1968) included four species (*Andrena cordalis* Morawitz, *A. cypria* Pittioni, *A. torda* Warncke, *A. vaulogerii* Pérez) from European Russia, North Africa and Asia Minor including Cyprus, and Warncke (1975) added two species (*A. hedikae* Jaeger, *A. pagophila* Warncke) from Turkey. Osytshnjuk (1977) treated *A. cordalis* from Ukraine and Dylewska (1987) recorded the same species from Middle Europe and named this subgenus *Andrena cordalis* group. Gusenleitner & Schwarz (2002) moved *A. hedikae* to the subgenus *Aenandrena*.

In eastern Asia any species of this subgenus has not been recorded up to the present. In this paper, we recognize two species of this subgenus, for the first time, from eastern Asia, including one new species from Xinjiang Urgur, China. Another species, *Andrena cordalis* Morawitz is recorded, for the first time, from eastern Asia. The holotype will be preserved in the Institute of Zoology, Chinese Academy of Sciences, Beijing, China, and the paratypes will be deposited in the above institute and the Entomological Laboratory, Kyushu University, Fukuoka, Japan.

Subgenus *Cordandrena* Warncke

Cordandrena Warncke, 1968, Mem. Est. Mus. Zool. Univ. Coimbra, (307): 63-64; Osytshnjuk, 1977, Fauna Ukraini, 12 (5): 146-148; Gusenleitner & Schwarz, 2002, Entomofauna, suppl., 12: 30. Type-species: *Andrena cordalis* Morawitz, 1878, by original designation.

Andrena cordalis-Gruppe Dylewska, 1987, Acta Zool. Cracoviensia, Poland, 30 (II) 12: 515-517.

Diagnosis: Small bees; facial quadrangle broader than long or quadrate; facial fovea narrow; malar space linear; pronotum without humeral angle and ridge; propodeum with large dorsal enclosure; propodeal corbicula moderately developed and tibial scopal hairs normal; first transverse cubital vein far from pterostigma; metasomal terga distinctly punctate with crowded punctures including apical areas; apical margins of metasomal terga with hair bands. Male clypeus black; sterna with well-formed subapical fimbriae, sternum 6 not reflected.

Key to species of the subgenus *Cordandrena* in eastern Asia

Female

1. Clypeus strongly convex, smooth and shiny; mesoscutum and scutellum smooth and shiny; pygidial plate V-shaped with raised triangular area; first flagellar segment as

- long as flagellar segment 2 plus 3; length short, 6-7 mm *yukawai* n. sp.
- Clypeus weakly convex weakly tessellate; mesoscutum and scutellum weakly tessellate; pygidial plate U-shaped without raised triangular area; first flagellar segment shorter than flagellar segment 2 plus 3; length longer, 8-10 mm *cordialis* Morawitz

1. *Andrena (Cordandrena) yukawai* n. sp.

(Figs. 1: A-E, 2: A-E, 3: A-E)

Female: BL 6.2-7.2 mm, WL 4.7-5.7 mm (n=4).

Color: Flagellum reddish brown beneath except basal portion; mandible with apical half or less reddened; wing membranes subhyaline, weakly brownish basally, veins and pterostigma reddish brown; tibial spurs yellowish; posterior margins of metasomal terga reddish brown.

Pubescence: Hairs on head and thorax sparse, whitish; those on clypeus sparse broadly, 100-200 μ apicolaterally; those on vertex 200-300 μ ; those on genal area slightly dense; facial fovea brown above, whitish below. Hairs on mesoscutum and scutellum scanty; those on mesepisternum 240-300 μ ; propodeal corbícula not well developed, with moderately long dorsal fringes, internal area with sparse simple hairs; trochanteral floccus nearly perfect, whitish, femoral floccus dense; tibial scopa moderately developed, with simple whitish scopal hairs. Hairs on metasomal terga scanty; terga 2-4 with broadly interrupted whitish hair bands; caudal fimbria yellowish white; sterna 2-5 with whitish subapical fimbriae.

Structure: Head: HL/HW = 0.80. HW: MsW: MtW = 2.2: 2.2: 2.5. Vertex shagreened by dense tessellation and close minute PP. OOD: POD: OCD = 0.5: 0.35: 0.1. FL1 = FL2+3, FL2 = FL3 which are broader than long, intermediate segments broader than long. Eyes with inner margins subparallel. Facial fovea narrow, exceeding below a line at lower margins of antennal fossae, FVL = 1.0 mm, FVW = 0.2 mm. Supraclypeal area and face above antennal fossae with longitudinal rugulae, interrugal area with coarse minute PP, dull roughened. Facial quadrangle quadrate (about 1.6: 1.6). Clypeus strongly convex medially, smooth, surface shiny with crowded PP ϕ 20 μ , IS < 0.5, CPL = 0.7 mm. Process of labrum moderate, entire apically. Lower paraocular area smooth and shiny with coarse PP. Malar space linear. Genal area broader than eye, GW: EW = 0.6: 0.5, surface weakly tessellate, narrowly shiny with close minute PP near eye.

Mesosoma: Pronotum without humeral angle and ridge, surface weakly tessellate, shiny; pronotum with minute PP dorsally, without PP dorsoventrally. Mesoscutum and scutellum smooth and shiny with distinct crowded PP ϕ 20 μ , IS < 0.5. Propodeal enclosure large, strongly rugose all over; dorsal face sculptured as in enclosure. Mesepi-

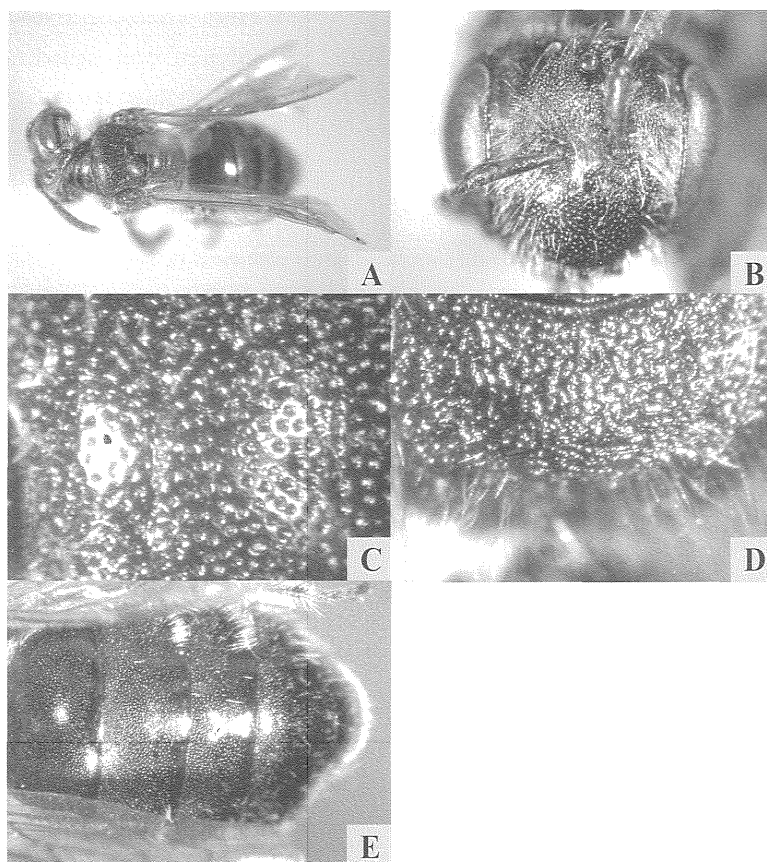


Fig. 1: A-E: *Andrena (Cordandrena) yukawai* n. sp., female. A. general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

sternum densely tessellate, shagreened medially. Hind tibia enlarged at apex. Vein 1st *m-cu* meeting second submarginal cell at middle of cell. *Metasoma*: Metasomal terga very weakly tessellate, surface broadly shiny with crowded PP $\phi 10\mu$, IS < 0.5; PP on tergum 4 weaker and sparser apically; posterior depressions of terga broad, well indicated; pygidial plate V-shaped with weakly raised internal area. Sterna 2-5 finely tessellate, narrowly shiny with shallow close minute PP apically.

Male: BL 6.0 mm, WL 4.7 mm (n= 2).

Color: Flagellum reddish brown beneath; mandible with apical half reddened; wing membranes subhyaline, veins and pterostigma yellowish brown; basitarsi reddish brown, tibial spurs yellowish; posterior depressions of metasomal terga reddened.

Pubescence: Hairs on head and thorax sparse, dull white; those on clypeus 140-200 μ ; those on antennal area more or less dense; those on vertex 200 μ ; those on genal area

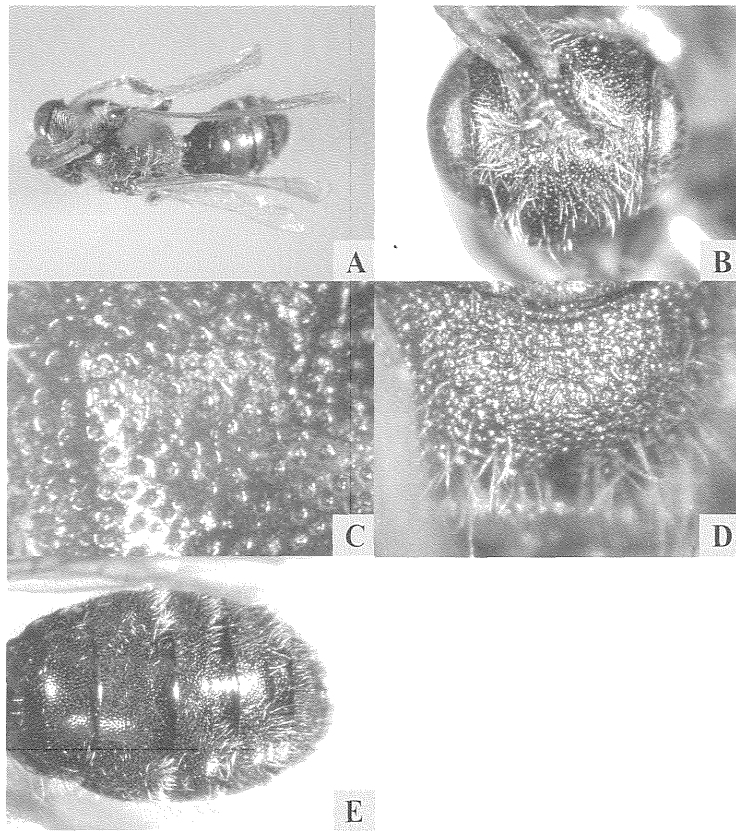


Fig. 2: A-E: *Andrena (Cordandrena) yukawai* n. sp., male. A. general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

160 μ , dense; those on mesoscutum and scutellum sparse, 100-300 μ marginally; those on mesepisternum 400 μ . Hairs on metasomal terga extremely short, white; terga 2-4 with broadly interrupted white hair bands; terga 5-6 with long whitish hairs; sterna 2-5 with sparse, well-formed whitish subapical fimbriae.

Structure: Head: HL/HW = 0.80. HW: MsW: MtW = 2.0: 1.7: 1.7. Vertex densely tessellate. OOD: POD: OCD = 0.4: 0.3: 0.1. FL1 > FL2, FL2 < FL3, FL2 broader than long. Eyes with inner margins subparallel. Supraclypeal area and face above antennal fossae with longitudinal rugulae, interrugal area with close minute PP, surface dull shagreening. Facial quadrangle quadrate (about 1.4: 1.4). Clypeus well convex, surface smooth and shiny, with PP ϕ 10 μ , IS < 0.5, CPL = 0.6 mm. Process of labrum as in female, smaller. Lower paraocular area sculptured as in clypeus, but PP denser. Malar space linear. Genal area as broad as eye, GW: EW = 0.5: 0.5, surface sculptured as in female. *Mesosoma:* Thoracic form and sculpture as

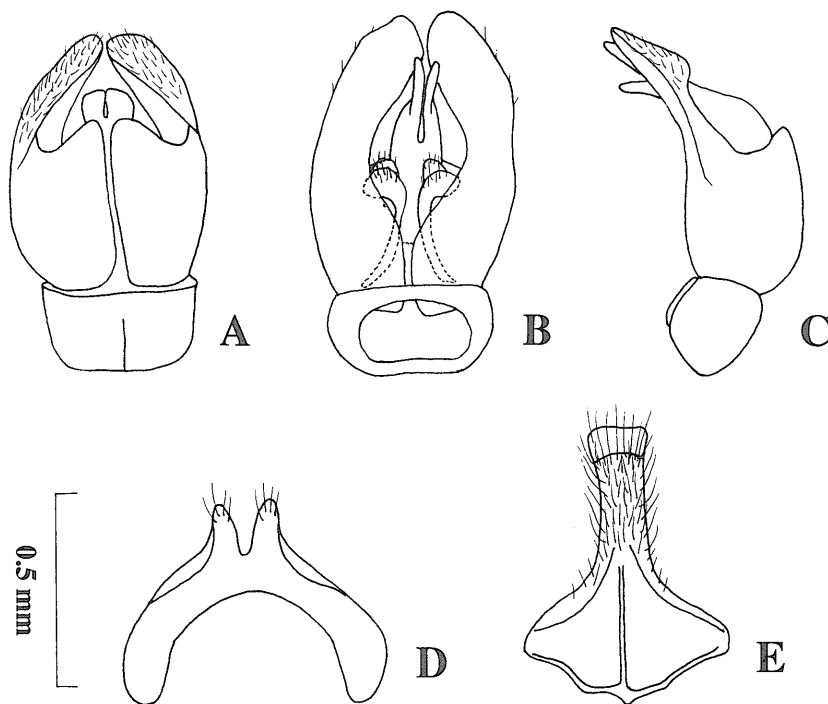


Fig. 3: A-E: *Andrena (Cordandrena) yukawai* n. sp., male. A. Genital capsule and subgenital sternum. A: dorsal view of genital capsule; B: ventral view of the same; C: lateral view of the same; D: metasomal sternum 7; E: metasomal sternum 8.

in female. *Metasoma*: Metasomal terga smooth and shiny with distinct crowded $PP\phi 10\mu$, $IS < 0.5$, sparser at apical areas; posterior depressions of terga well indicated. Sterna 2-5 sculptured as in female; sternum 6 flat and not emarginate apically.

Type material. Holotype female, north slope of Mt. Tianshan, 1,600m, Road U-Ku, Xinjiang Uygur Autn. Region, China, 10. vii. 1960 (F-c. Zhang); Paratypes: CHINA: Xinjiang Uygur Autn. Region: 1 female, same data as the holotype; 1 female, same locality as the holotype, 13. vi. 1960 (S-y. Wang); 1 female, Pukang, 1,910m, 30. viii. 1959 (S-y. Wang); 1 female, Shaosu, 1,620m, 7. viii. 1957 (G. Wang); 1 male, Fuyun, 1,200m, 11. vii. 1960 (S-y. Wang); 1 male, same locality and collector as above, 12. vii. 1960.

Remarks. This species is similar to *Andrena cypria* Pittioni, but both sexes can be distinguished from *cypria* by the clypeus shiny and distinctly punctated, the mesoscutum smooth and shiny and the propodeum more coarsely rugosed.

Distribution. China (Xinjiang Uygur Autn. Region).

Floral association. Not available.

Flight records. Female: mid June to late August; male: mid July to early August.

Etymology. The specific name, *yukawai*, honors Prof. J. Yukawa of the Entomological Laboratory, Kyushu University, Fukuoka and the former president of the Entomological Society of Japan, who supported our study in various ways.

2. *Andrena (Cordandrena) cordialis* Morawitz

(Figs. 4: A-E)

Andrena cordialis Morawitz, 1878, Horae Soc. Ent. Ross., 14: 74-76 [female & male, Kaukasus]; Schmiedeknecht, 1883, Apidae Europaeae, Tom I: 633; Stöckert, 1930, Hym. Nord- und Mitteleurop.: 942-943, 983 [female & male, in key]; Kocourek, 1966, Acta Faun. Ent. Mus. Natn. Pragae, 12, suppl., 2: 98.

Andrena (Cordandrena) cordialis: Warneke, 1968, Mem. Est. Mus. Zool. Univ. Coimbra, (307): 64; Osytsnjuk, 1977, Faun. Ukraini, 12(5): 146-148; Osytsnjuk, 1978, Opered, Faune SSSR, 119: 319, 364; Dylewska, 1987, Acta Zool. Cracoviensia, Poland, 30 (II) 12: 516-517; Gusenleitner & Schwarz, 2001, Entomofauna, 22: 111-113; Gusenleitner & Schwarz, 2002, Entomofauna, suppl., 12: 200-202.

Redescription based on specimens from East Asia.

Female. BL 8.0-10.2 mm, WL 7.5-8.0 mm (n= 2).

Color: Flagellum reddish brown below except basal portion; mandible with apical half reddened; wing membranes subhyaline, moderately brownish at apical two-thirds, veins and pterostigma brown; tibial spurs yellow; posterior margins of metasomal terga reddish brown.

Pubescence: Hairs on head moderately dense, dull white; those on clypeus 300 μ ; those on vertex 500 μ ; those on genal area 300 μ ; facial fovea brown above, whitish below. Hairs on mesoscutum and scutellum sparse, dull white; propodeal corbicular not well developed, with moderate long dorsal fringes, internal area with sparse simple hairs; trochanteral floccus imperfect, white; femoral floccus dense; tibial scopal hairs long, simple, white. Hairs on metasomal terga scanty; terga 2-4 with white hair bands, broadly interrupted on tergum 2; caudal fimbria brown with white hairs laterally; sterna 2-5 with complete white subapical fimbriae.

Structure: Head: HL/HW = 0.78. HW: MsW: MtW = 3.2: 3.0: 3.5. Vertex shagreened by dense minute PP. OOD: POD: OCD = 0.66: 0.44: 0.2. FL1 < FL2+3, FL2 = FL3 which are as long as broad, intermediate segments about as long as broad. Eyes with

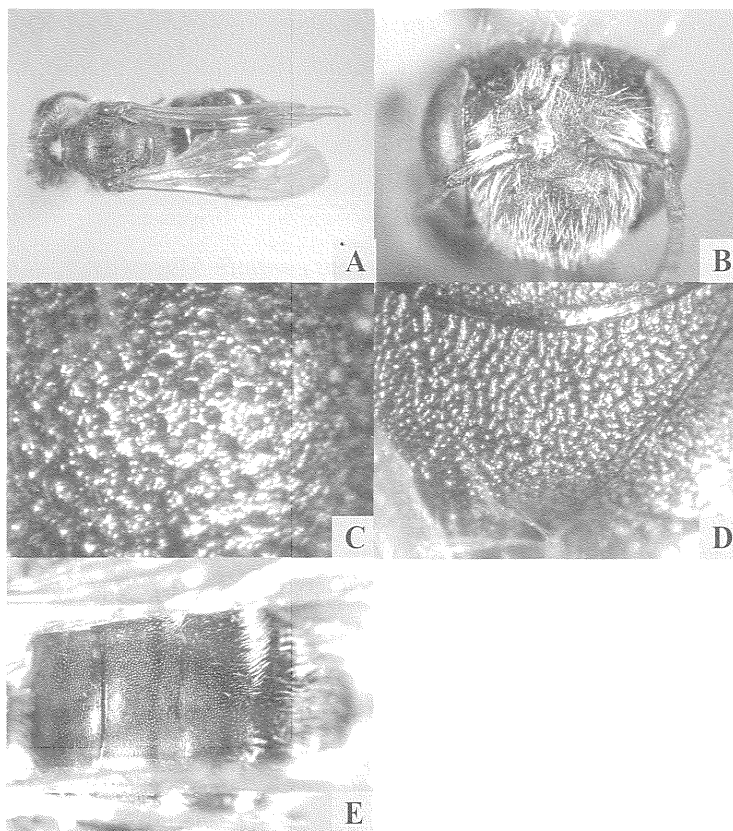


Fig. 4: A-E: *Andrena (Cordandrena) cordialis*, female. A. general habitus; B: head in frontal view; C: mesoscutum; D: propodeum; E: metasomal terga.

inner margins subparallel. Facial fovea moderate, far exceeding below a line at lower margins of antennal fossae, separated from eye by narrow punctate space, FVL = 1.4 mm, FVW = 0.4 mm. Supraclypeal area densely minutely punctate, weakly tessellate. Face above antennal fossae with fine longitudinal rugulae, interrugal area with small PP. Facial quadrangle broader than long (about 2.2: 2.0). Clypeus broad, weakly rounded from side to side, surface weakly tessellate, with $PP\phi 20\mu$, IS = 0.5 or PP denser and smaller laterally, CPL = 1.0 mm. Process of labrum broad, short, surface smooth and shiny. Lower paraocular area dull by linear crowded PP. Malar space linear. Genal area broader than eye, GW: EW = 1.0: 0.7, surface broadly, densely tessellate posteriorly, narrowly shiny with close minute PP near eye. *Mesosoma*: Pronotum without humeral angle and ridge, surface reticularly shagreened dorsoventrally, weakly tessellate with very weak PP dorsally. Mesoscutum and scutellum finely tessellate, surface with close minute PP, IS = 0.5 or denser. Propodeal enclosure large, well defined, weakly rugose all over; dorsal face roughened. Mesepisternum moderately shagreened by dense

roughened punctures. *Metasoma*: Metasomal terga weakly tessellate, shiny; terga 1-3 with fine minute PP, $IS < 0.5$; tergum 4 with same PP, $IS = 0.5-1$; posterior depressions of terga narrow, well indicated. Pygidial plate U-shaped without internal raised triangular area, crowdedly punctate. Sterna 2-5 weakly tessellate with minute PP.

Specimens examined. CHINA: Xinjiang Uygur Autn. Region: 2 females, north slope of Mt. Tianshan, 1,600m, 11-13. vi. 1963 (S-y. Wang).

Remarks. This species is very similar to *Andrena pagophila* Warncke in female, but can be separated from *pagophila* by the smaller size, the metasomal terga with sparser punctures, especially on tergum 1. It is also very similar to *Andrena torda* Warncke in female but is recognized by the metasomal hair bands broader and less interrupted in the middle, the clypeus densely tessellate and less shiny, the mesoscutum more tessellate and less shiny and the metasomal terga with sparser punctures.

Distribution. China (Xinjiang Uygur Autn. Region), Turkmenistan, European Russia, Caucasus, Ukraine, Turkey, Greece, Romania, Bulgaria, Hungary, former Yugoslavia.

Floral association. Not available.

Flight records. Female: mid June.

Acknowledgments

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